HOW DO WE EVALUATE THE VULNERABILITIES OF MIGRATORY SPECIES TO CLIMATE CHANGE?

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VULNERABILITY ASSESSMENT

◆ Some species may be relatively easy

OTHERS PRESENT MAJOR DIFFICULTIES - SUPERMIGRANTS

RED KNOT MIGRATION AND STOPOVER SITES

MIGRATORY WILDLIFE VULNERABILITY ASSESSMENT

- Difficult challenges for VA:
  - Highly extravagant lifestyles
  - Where? Breeding range, wintering range, stopover sites, migration itself, all of above?
  - Synchronicity?
  - Data hard to come by from parts of range
  - Wind?

RED KNOT – WHERE ARE THE VULNERABILITIES?

- Tierra del Fuego?
- Argentina coast?
- Brazil?
- Mid-Atlantic states?
- Hudson's Bay?
- High Arctic?

- Fall or spring?
- Wind patterns?
- Synchronicities?

Comprehensive VA Needed?

Vulnerabilities of Shorebirds to Climate Change

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Objectives

◆ Evaluate change in extinction risk of North American shorebirds due to climate change

Why Shorebirds?

◆ Reported widespread declines

◆ Sentinels of global environmental change because of their hemispheric ecosystem use

◆ Migratory aggregations of some species are a spectacular biological phenomenon

◆ Iconic species valued by public?

SHOREBIRDS ARE IN TROUBLE
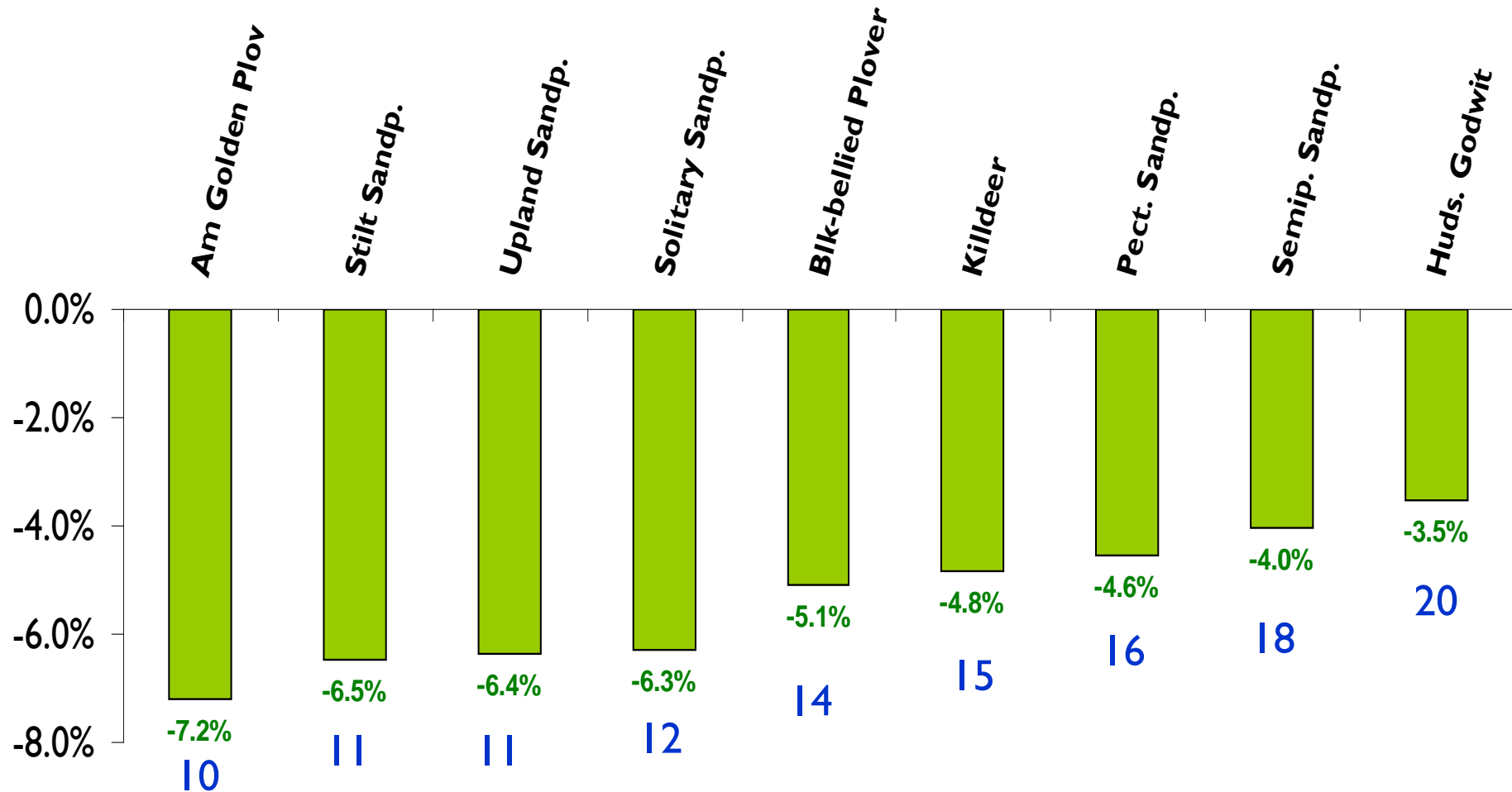
Based on migration counts in eastern N. America; Bart et al 2007. *J Av. Biol*

MAIN QUESTIONE ASKED

◆ How much does climate change move the needle on the existing vulnerability categories of USCP/PIF?

U.S. Shorebird Conservation Plan
Risk Categories

1) Not at Risk

2) Low Concern

3) Moderate Concern

4) High Concern

5) Highly Imperiled

6) ~~Holy Smokes!   Really, highly imperiled~~ Critical

Vulnerability Factors

	Score	Arrow
1) Loss/gain in breeding habitat under climate change	3	↑
2) Loss/gain in wintering habitat under climate change	5	↑↑
3) Loss/gain in migration habitat under climate change	3	↑
4) Degree of dependence on ecological synchronicities	5	↑↑
5) Migration distance	4	↑
6) Degree of breeding, wintering, or migration habitat specialization	4	↑↑

Risk Factors

1) Loss/gain in breeding habitat under
   climate change: Score   Arrow

Major loss (>50%)	5	↑↑
Moderate loss (10-50%)	3	↑
Limited or no loss (-10-10%)	0	0
Moderate increase (10-50%)	-1	↓
Major increase (>50%)	-2	↓↓

Note: risk could decrease

Example: Semipalmated Sandpiper

1) Loss/gain in breeding habitat under
   climate change:

	Score	Arrow
Moderate loss (10-50%)	3	↑

Yearlong rainfall predicted to ↑ throughout breeding range. May result in flooding & loss of much breeding habitat especially since the species prefers drier areas with access to water. Nesting habitats along shorelines also could ↓ as a result of increased rainfall.
Confidence = low

Semipalmated Sandpiper

	Score	Arrow
1) Loss/gain in breeding habitat under climate change	3	↑
2) Loss/gain in wintering habitat under climate change	5	↑↑
3) Loss/gain in migration habitat under climate change	3	↑
4) Degree of dependence on ecological synchronicities	5	↑↑
5) Migration distance	4	↑
6) Degree of breeding, wintering, or migration habitat specialization	4	↑↑

Change in status from 'moderate concern' to 'highly imperiled'

Application

◆ Evaluated 49 species of shorebird breeding in North American north of Mexico

◆ For each factor, included confidence level

◆ Determined shifts in risk categories

Results for 50 Shorebirds

◆ 43 species (86%) predicted to ↑ risk level due to climate change

– 34 increased by 1 level

– 9 increased by 2 levels

◆ 3 species at lower risk

◆ Solitary sandpiper – more breeding habitat

◆ Bristle-thighed curlew – more breeding & wintering habitat

◆ White-rumped sandpiper – more wintering habitat

U.S. Shorebird Conservation Plan

Risk Category	Current	Expected with climate change
Not at risk	0	0
Low concern	7	2
Moderate concern	15	7
High concern	23	13
Highly imperiled	4	17
Critical	–	10

Species in New 'Critical' Category

◆ Snowy Plover

◆ Wilson's Plover

◆ Piping Plover

◆ Mountain Plover

◆ Am. Oystercatcher

◆ Long-billed curlew

◆ Bar-tailed godwit

◆ Ruddy turnstone

◆ Sanderling

◆ Short-billed dowitcher

Where from here?

◆ Detailed species-specific VA

◆ ID common risks as focus for management activity

  – e.g., shoreline habitat on migration routes & wintering areas

◆ Still reviewing the assessments & considering degree of threat to shift risk category

◆ We welcome feedback, things to consider, insights, information

TAKE HOME MESSAGES

- For complex spp. We need complex, comprehensive VA

- They are doable (?)

- Build off of existing structures if possible (PIF, NAWP, etc.)

- Must be resilient to lack of data

- Can they be applied to less well-known species?